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Development of Mobile Application for Enhancing Emotion Management for UTHM Students using DASS-21

Jasline Tan Jia Yi[1], Mohd Norasri Ismail[2,*], Mohd Farhan Md Fudzee[2], Muhammad Hanif Jofri[3], Mohd Al Hafiz Nordin[4]

[1] N Nano Travel & Tours Sdn. Bhd., 15 & 15a, Jalan Laksamana 1, Taman Ungku Tun Aminah, Skudai, Johor, Malaysia
[2] Application & Research on Multimedia Focus Group, Department of Multimedia, Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia, 864000 Parit Raja, Johor, Malaysia
[3] Department of Information Technology, Center for Diploma Studies, Universiti Tun Hussein Onn Malaysia, 864000 Parit Raja, Johor, Malaysia
[4] ICT Division, Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia, 864000 Parit Raja, Johor, Malaysia

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ABSTRACT

Managing one's emotions is a crucial skill, particularly for university students facing intense academic and social pressures in today's competitive environment. However, Malaysian university students often struggle with limited emotional awareness, which further compounds their mental health challenges. Therefore, a mobile application called Therapist was proposed to offer assistance for university students in managing their emotion based on DASS-21 inventory model. The mobile application was developed using a Multimedia Mobile Content Development method. Usability testing was conducted with the target user group using the System Usability Scale. A score of 86 was obtained from the results, which is "acceptable" in the Acceptability Ranges scale's. This corresponds to a "B" grade on the Grade Scale and an "Excellent" Adjective Rating. The results suggest that the Therapist application can be a valuable tool for enhancing students' emotional management capabilities especially for Universiti Tun Hussein Onn Malaysia (UTHM) students.

1. Introduction

Higher education has been increasingly competitive in recent years, which has led to heightened academic demands on university students, rendering this population particularly vulnerable to mental health challenges [1-4]. Numerous mental health issues that university students deal with, such as stress, anxiety, and depression, can negatively impact their general well-being and academic performance. The COVID-19 pandemic has further exacerbated these issues, highlighting the need for accessible and effective mental health interventions tailored to this population. A promising strategy for managing university students' mental health needs is the use of mobile health applications. These apps can provide personalized, on-demand support and have the potential to overcome barriers to traditional face-to-face therapy, such as stigma, cost, and accessibility.

* *Corresponding author.*
E-mail address: norasri@uthm.edu.my

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Maintaining emotional regulation has significant implications for the health and well-being of an individual [5]. One approach is to use an instrument known as a mood chart or tracker, which regularly records a person's emotional state at regular intervals [6-8]. Such an instrument aims to systematically identify trends in the fluctuations of an individual's emotional state over time, as well as in relation to different circumstances and environments [8]. Another approach is by implementing the Depression Anxiety Stress Scale 21 (DASS-21) to do self-assessment on mental health, that evaluates the dimensions of depression, anxiety, and stress [9,10].

Based on the DASS-21 inventory survey data, 44.2% of the 355 Malaysian university students sampled reported experiencing occasional depressive symptoms, characterized by negative emotional states [11]. The Malaysian government has launched mental health promotion measures, created mental health programs, integrated counseling services on university campuses, and organized cross-agency collaborative efforts to address the growing need for mental health support. However, despite these efforts to raise awareness, Malaysian students' mental health challenges persist. This is exacerbated by students' reluctance to seek help and consult professionals, stemming from feelings of inadequacy or stigma. The increase in mental health problems among college students has been attributed in part to a lack of emotional awareness and unfavorable attitudes toward emotional management [12-15]. Implementing technological solutions can enhance the efficacy of emotional management practices, which are crucial in various contexts. Therefore, the purpose of this suggested project is to develop a mobile application named "Therapist" that will teach college students how to properly manage their emotions.

Based on the DASS-21 inventory paradigm, the project's goal is to design, develop, and assess the "Therapist" mobile application, which will help college students with self-journaling and emotional management. The proposed application aims to offer guidance for managing emotions in constructive ways. Additionally, the application will include a feature for recording daily emotions, allowing users to select from various feeling options. Furthermore, the application will provide mood patterning capabilities, enabling users to view their emotional trends and offer a journal space where users can securely express their thoughts. The application will also feature a brief deep breathing activity with a timer to assist users in practicing mindfulness and relaxation techniques.

1.1 Related Works on Mental Health Mobile Applications

Mobile applications for emotion management provide a useful and adaptable way to serve college students' mental health needs. Emotion management smartphone apps provide a useful and adaptable way to help university students with their mental health concerns. To assist students in efficiently managing conditions including anxiety, stress, and depression, these applications make use of a variety of evidence-based strategies, including professional counseling, mindfulness exercises, and cognitive-behavioral therapy. The psychological and educational fields have acknowledged the pivotal role of cultivating university students' emotional regulation capacities, which are essential for their societal adaptation, well-being, and personal growth [16].

The "MindShift CBT" app, for example, provides thought-challenging exercises, relaxation techniques, and goal-setting tools that have been shown to be effective in improving mental well-being among university students [17,18]. By guiding users through these evidence-based interventions, the app aims to help students better understand their own mental processes and emotional reactions while also empowering them to create coping mechanisms. Similarly, the "Calm" app focuses on promoting mindfulness and meditation, which studies show can greatly alleviate this population's stress, anxiety, and depression symptoms [19,20]. Through its guided meditations, sleep stories, and other mindfulness-based features, the app helps students cultivate a greater sense of

present-moment awareness and emotional regulation. The "Sanvello" app takes a more comprehensive approach, offering a combination of cognitive-behavioral therapy, mindfulness exercises, and mood tracking features [21]. The app seeks to address the complex nature of mental health issues experienced by university students by offering them a wide range of tools and services. Research has indicated that the application is successful in lowering university students' symptoms of anxiety and depression, making it a valuable tool for holistic mental health management. Furthermore, the "Talkspace" app offers students the opportunity to receive professional support remotely, which may be particularly appealing to those who face logistical or stigma-related barriers to in-person counseling [22]. This format allows students to access licensed therapists through text, voice, and video messaging, providing a discreet and convenient way to seek mental health support. Last but not least, research has demonstrated that the "Headspace" app, which focuses on mindfulness and meditation techniques, improves university students' mental health by lowering their feelings of anxiety and depression [19,23]. By incorporating these evidence-based techniques, the app aims to help students cultivate a greater sense of inner calm, focus, and emotional resilience. All things considered, these mobile emotion management apps offer a wide range of resources and methods to promote college students' mental health and wellbeing. Overall, a wide range of strategies and tools are offered by these mobile emotion management apps to assist university students' mental health and wellbeing. By offering convenient, accessible, and personalized approaches to addressing mental health challenges, these apps have the potential to significantly improve the academic and personal experiences of university students.

1.2 Mental Health Self Assessment Used

Assessing mental health levels can be done in a variety of ways. The Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), and Depression, Anxiety, Stress Scale-21 (DASS-21) are a few of the most widely used. For this project, we use the DASS-21 inventory model [24,25] due to its practicality, cultural adaptability, and effectiveness in assessing depression, anxiety, and stress [25,26]. It is short, easy to administer, and cost-effective, making it suitable for widespread use in education, workplaces, and healthcare. Also, the Malay version has been validated for reliability, ensuring cultural relevance [27,28]. The purpose of the DASS-21 is to measure the existence and intensity of negative emotional events, such as stress, anxiety, and depression. Instead of depending on diagnostic thresholds, it emphasizes the severity of a person's symptoms and is based on a dimensional perspective of psychiatric disorders. The DASS-21 is a condensed version of the 42-item DASS that was created in 1995 by Lovibond and colleagues [24,29-31]. The DASS-21 is composed of three distinct subscales that evaluate the domains of depression (DASS-D), anxiety (DASS-A), and stress (DASS-S) [32,33]. Elevated DASS-21 scores suggest a reduced quality of life and emotional distress, though the inventory does not offer clinical diagnoses or illuminate the underlying causes of these negative emotional states [15,34]. The DASS-21 aligns with Malaysia's focus on addressing rising mental health concerns, aiding early detection, raising awareness, and supporting data-driven policy development [11,26,35,36].

2. Methodology

The Therapist mobile application will be developed using the Multimedia Mobile Content Development (MMCD) approach. Grounded in an agile development approach, MMCD is a widely adopted methodology in contemporary mobile application development practices [37]. Figure 1

shows the MMCD Methodology's five stages: Application Idea Creation, Structure Analysis, Process Design, Main Function Development, and Testing.

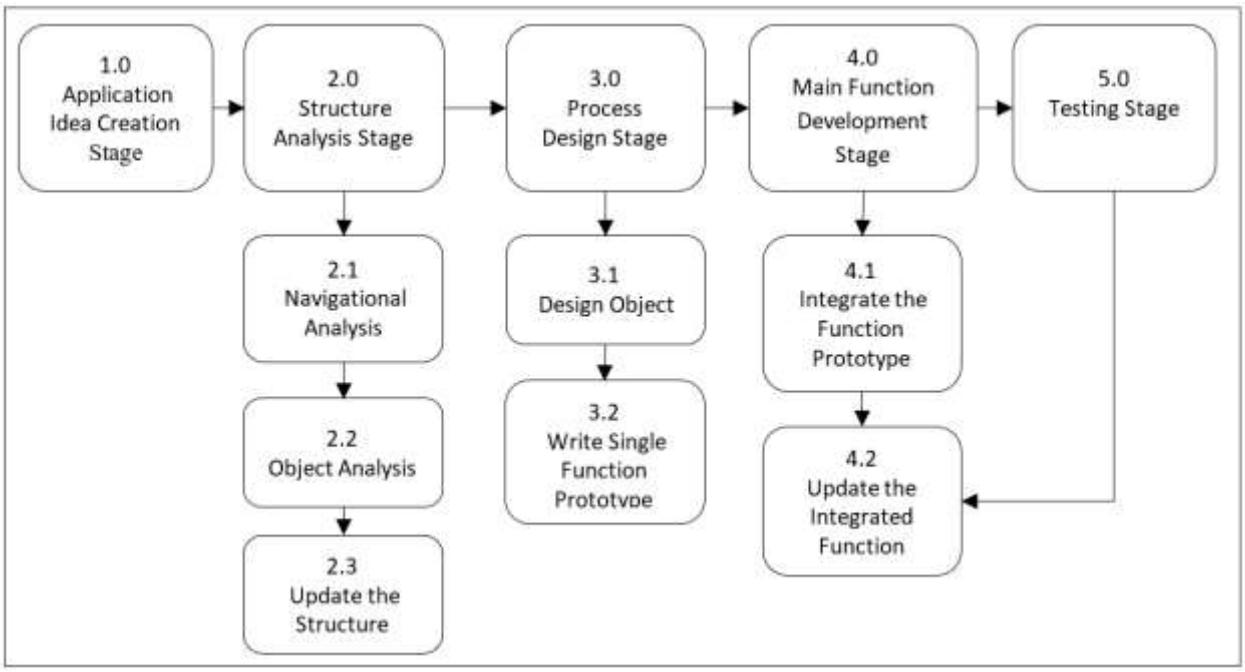


Fig. 1. MMCD methodology [37]

2.1 Application Idea Creation Stage

The MMCD methodology's initial stage was to develop the application concept. During this step, the team gathered the necessary information to design and develop the "Therapist" app. First, we had an interview with Dr. Aspalaila binti Abdullah, a Subject Matter Expert who serves as the Deputy Chief Officer of Psychology at the University Counseling Center at Universiti Tun Hussein Onn Malaysia. Table 1 contains the set of interview questions.

Table 1
Interview questions

No.	Question
Q1	Can you tell me about your role as a counseling officer and your experience working with university students?
Q2	From your perspective, what are the biggest mental health challenges faced by university students today?
Q3	Is there any approach or guideline for student do personal mental health self-assessment?
Q4	Do you think mobile apps can play a role in supporting students' mental health? If yes, how?.
Q5	What features do you think a mental health app for students should include to complement the services you provide?
Q6	How useful would mood-tracking features be for students? What format (e.g., journals, mood scales) would be most effective?
Q7	How important is data privacy in a mental health app for students?
Q8	What measures should be in place to ensure students feel comfortable sharing their moods or thoughts on the app?
Q9	What accessibility features would you recommend for an app aimed at supporting mental health (e.g., easy navigation, multilingual support, visual simplicity)?
Q10	Do you have any additional recommendations or concerns about developing such an app?

From the interview, we intend to get insight into viability, functionalities and how the application will work by using thematic analysis. Table 2 contains a tabulation of the interview results analysis.

Table 2
Interview result analysis

Features	Requirements
Content	• Employ DASS-21 inventory model to develop and integrate the application's content. • Apply professional guidance in content.
Features and functionalities	• Provide emotional guidance module, self-reflective module, mood chart/tracking module, and journal module • App have offline functionality (e.g. mood tracking without an Internet connection)
User interface	• App must be visually appealing and easy to use. • Design for minimal cognitive load. • Visual must be simple and minimalistic: showcasing only the most essential elements and functionalities. • User interface elements such as fonts, colours, or button styles must be consistent.
Usability	• The system should always provide users with timely, relevant feedback to let them know what's happening. • Navigation must be simple and easy to avoid confusion.
Privacy and security	• Ensure data privacy and confidentiality. • Ensure students feel comfortable sharing their emotion or thoughts on the app.

Furthermore, a series of questionnaires were administered to the target user group through Google Forms to get preliminary study about emotion management application among university students. Thirty responses were gathered from university students attending public and private universities. The questionnaire questions are listed in Table 3.

Table 3
Preliminary study questions

No.	Questions
Q1	What will you do when you encounter difficulties in managing and controling your emotion?
Q2	Have you tried any emotional management mobile application?
Q3	Do you think a mobile application on providing a proper emotional management will better help you to understand your mood patterns and managing your emotion?
Q4	What are your preferred features in mobile application that provides a guide on emotion management?
Q5	What are the basic features of mobile application that you prefer?

Based on Figure 2, the majority of respondents (17 persons, 56.7%) prefer to share their concerns with family and friends. This emphasizes the importance of interpersonal relationships as a fundamental coping technique for dealing with mental health issues. A sizable proportion (11 people, 36.7%) turn to the internet for answers or coping mechanisms. This demonstrates a reliance on digital resources and the possibility for technology-based therapies, such as mental health applications, to meet their requirements. Approximately 7 people (23.3%) take no effort to address their issues. This may suggest a lack of awareness, motivation, or access to good coping techniques or resources. Only one person (3.3%) sought professional treatment from a counselor. This implies potential stigma, lack of access, or preference for informal support systems over.

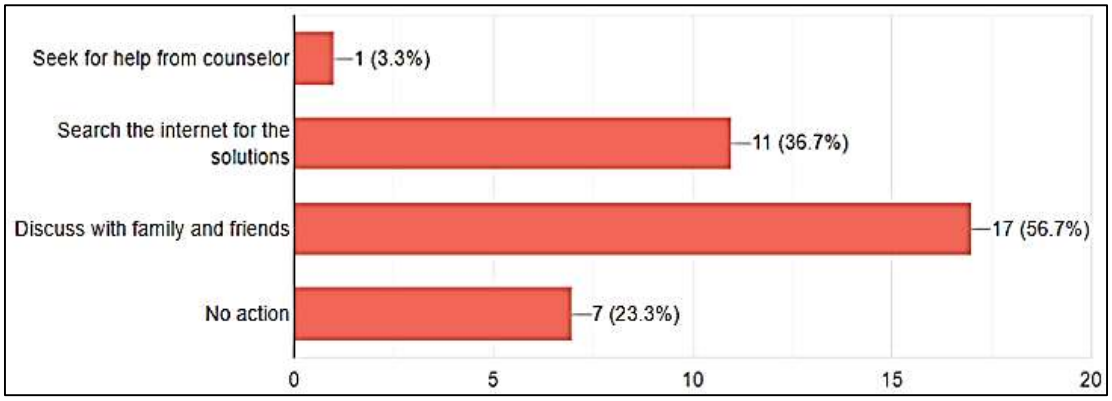


Fig. 2. Question 1 result

Figure 3 shows a large majority of respondents (76.7%) have not tried any emotional management mobile applications while only a small fraction (23.3%) has used such applications. The majority of respondents have not engaged with emotional management apps, indicating low awareness, accessibility issues, or lack of interest in such tools. This data highlights a significant opportunity to introduce emotional management applications to a largely untapped market. Educational campaigns could help raise awareness about the benefits of using these tools.

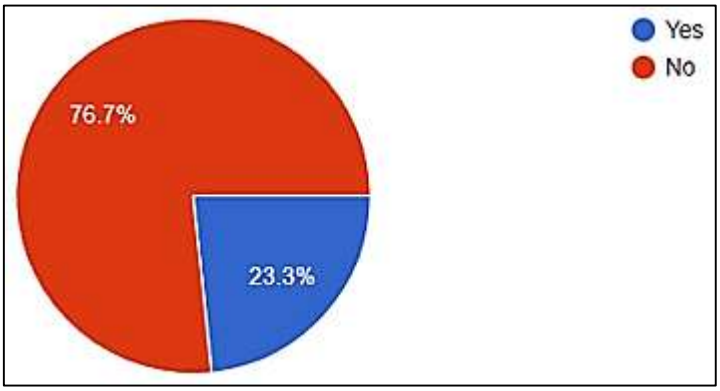


Fig. 3. Question 2 result

According to Figure 4, a significant majority of respondents (76.7%) believe that such an application would be beneficial, while a smaller proportion of respondents (23.3%) do not think so. The majority of respondents recognize the potential benefits of a mobile app for managing emotions and understanding mood patterns, highlighting a strong interest and need for such tools among users.

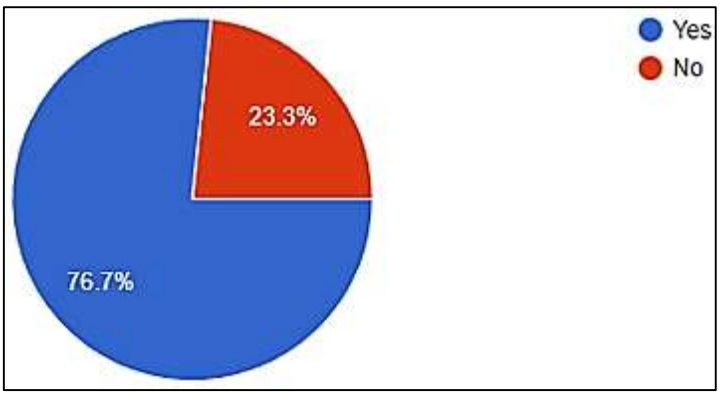


Fig. 4. Question 3 result

Based on Figure 5, the majority of users (80%) prefer an application that combines both emotional guidance and a mood chart. This suggests that users find value in having a holistic tool that not only tracks their emotions but also provides actionable guidance to manage them effectively. This feature could be considered a high-priority inclusion for such applications. The overwhelmingly high preference for combined features indicates that users likely see emotional guidance and mood tracking as complementary rather than separate tools. Developers should prioritize integrating multiple features into a single application to meet user expectations and increase engagement.

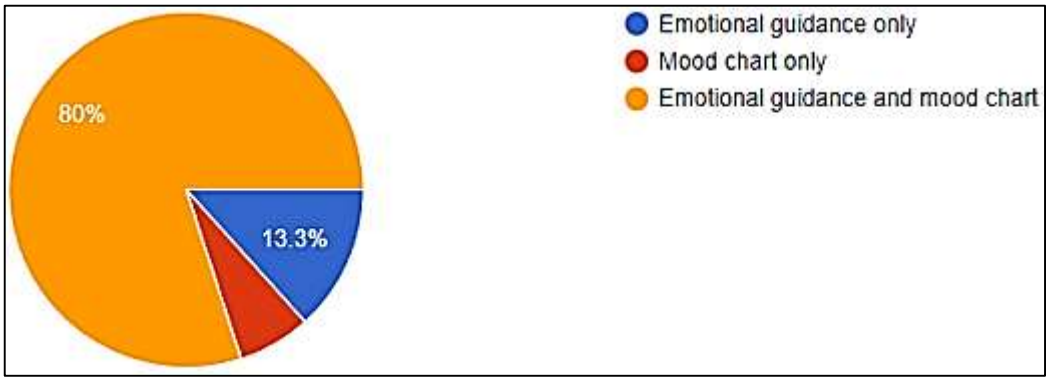


Fig. 5. Question 4 result

Based on Figure 6, users prioritize a mobile application that is free to download, simple and clean in its interface, and functional offline, with these features receiving the highest preferences (86.7% and 80%, respectively). While nearly half value security features like a passcode (46.7%), others moderately prefer options like a light background with dark text and background music (both 36.7%). A smaller group (26.7%) prefers a dark background with light text, indicating it is less favored. Overall, the focus should be on accessibility, usability, and reliability, with optional features for customization and security to cater to diverse needs. From this result, developers should prioritize creating a mobile application that is free to download, simple and intuitive in design, and functional offline, as these are critical for user adoption. Additionally, integrating security features like a passcode and offering customizable themes (light or dark mode) can cater to diverse user preferences. While optional features like background music can enhance the user experience, they should remain optional to avoid alienating users who may not find them appealing. Focusing on these priorities ensures a balance between usability, accessibility, and user satisfaction.

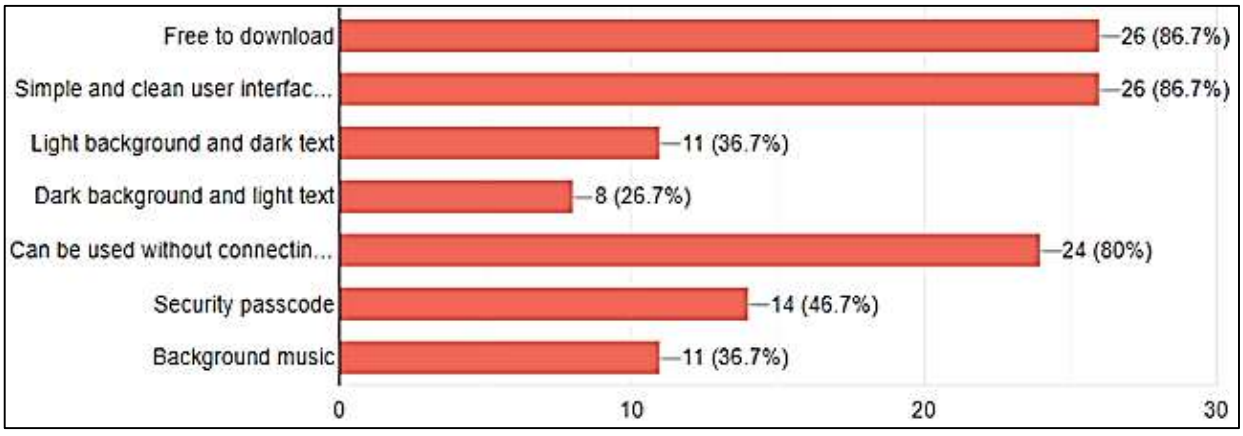


Fig. 6. Question 5 result

The application idea checklist is tabulated in the following Table 4.

Table 4
Application idea checklist

Item	Description
Type of application	Mobile application.
Target device	Android platform.
Target users	University students.
Graphical user interface	Login module, Registration module, Dashboard module, Emotional Guidance module, Self-Reflective Questions and Quotes module, Mood Chart module, Journal module.
Application Setting	Smooth 60 fps performance on most modern devices. The resolution settings compatible with different screen sizes and pixel densities.
Images	Icons, images of content elements.
Video	Relaxing video.
Animation	Application opening transition.
Audio	Relaxing music.
Application synopsis	The Therapist mobile application aims to offer guidance for emotional management and facilitate the recording of emotions and moods in the form of mood charts, targeting university students.

Based on Table 4, the Therapist mobile application is designed as an Android-based platform targeting university students, focusing on providing guidance for emotional management and mood tracking. Its primary objective is to facilitate the recording of emotions and moods while offering tools for self-reflection and personal growth. By catering specifically to university students, the application aims to address the unique challenges they face, such as stress, anxiety, and emotional regulation.

The application's graphical user interface (GUI) is structured into various modules, including login, registration, and dashboard functionalities. It also features modules for emotional guidance, mood charts, self-reflective questions, quotes, and journaling. These components work together to create a seamless and interactive user experience, helping users to manage their emotions effectively and track their progress over time. The design ensures accessibility and intuitiveness, making it easy for users to engage with the app.

Performance is optimized for modern Android devices, with a focus on maintaining smooth 60 FPS performance. The application is built to support different screen sizes and pixel densities, ensuring compatibility and usability across a wide range of devices. This adaptability enhances the user experience, making the app reliable and efficient in various settings.

To create a calming and engaging atmosphere, the app includes multimedia elements such as relaxing videos, background music, and smooth animations like opening transitions. These features are designed to support the emotional goals of the app, helping users feel at ease while interacting with its content. Additionally, visual aids like icons and content-specific images add to the clarity and aesthetic appeal of the interface.

2.2 Structure Analysis Stage

In this phase, two sub component that were analyze are the navigation and objects used in the application. Content structure check list as show in Table 5 below was produced during this activities, based on the application idea creation and discussions between the developers.

Table 5
Content structure checklist

Item	Description
Layers design	Layer 1: Background images
	Layer 2: Content
	Layer 3: Dart Scripting for Android Studio
Frame design	Frame 1: Launching interface
	Frame 2: Home interface (choose module)
	Frame 3: Registration module
	Frame 4: Login module
	Frame 5: Dashboard module
	Frame 6: Emotional Guidance module
	Frame 7: Category 1-6 (Emotion Category)
	Frame 8: Self-Reflective Questions and Quotes module
	Frame 9: Mood Chart module
	Frame 10: Journal module
	Frame 11: App Guide interface
	Frame 12: Exit pop-up
Menu and navigation	Start button
	App Guide button
	Login button
	Register button
	Back button
	Exit button
Number of main GUI	Application logo
Sub GUI	None
Images	Main background image (.png)
	Emotional category images such as 'anxiety', 'stress'
Video	Relaxing video.
Animation	Application opening transition.
Audio	Button clicking sound effect
	Relaxing music

Figure 7 shows the navigation structure of the application. There are 4 main modules of the application which are Emotional Guidance Module, Mood Chart Module, Self-Reflective Module and Journal Module. The figure also shown the sub-module of the application.

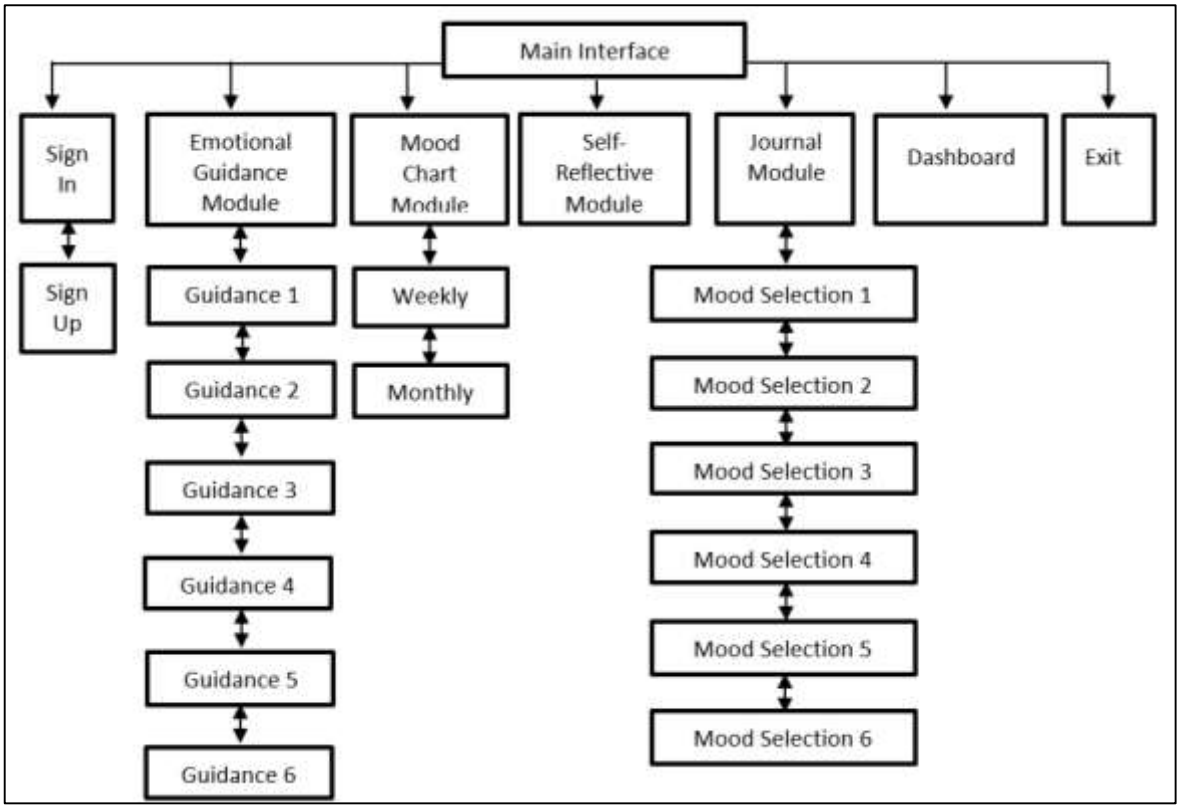


Fig. 7. Navigation structure

2.3 Process Design Stage

The third phase of the MMCD approach involves designing the process. The main objective of this stage is to prepare all the items as listed in the Table 5. This stage encompasses two subphases: designing objects and developing a single function prototype script. During this phase, the team completed the primary user interface designs for the application modules, as outlined in Table 6. Additionally, the database architecture was designed using Google Firebase and Google Firestore to store authentication and file data. For this project, the researchers utilized authoring tools like Adobe Photoshop, Microsoft PowerPoint, and Canva to create the 2D graphics and user interface designs. We choose pastel colour in our design. Since pastel colors are less saturated, they are often associated with calming and peaceful vibes. Pastel colors have a soft look that is soothing and easier on the eyes. Pastel colors have become a massive design trend in the past few years. Meanwhile, Android Studio will be used to compile the assets with scripting.

2.4 Develop Main Function Stage

In this stage, the primary functions of the proposed application were developed. This involved creating multimedia assets, including videos, graphics, and audio as detailed in Table 7, and integrating them into the Flutter platform. The integration of these functions was an iterative process, with continuous updates throughout the development stage to ensure seamless integration. Additionally, Dart scripts were created to enable the core functionalities of the application, such as implementing a video player, database storage, photo selection, mood chart rendering, and establishing interactions with Firebase and Firestore.

Table 6
Interface design

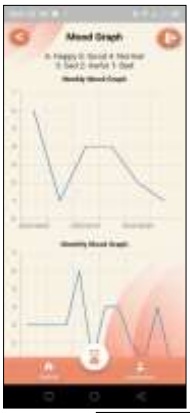
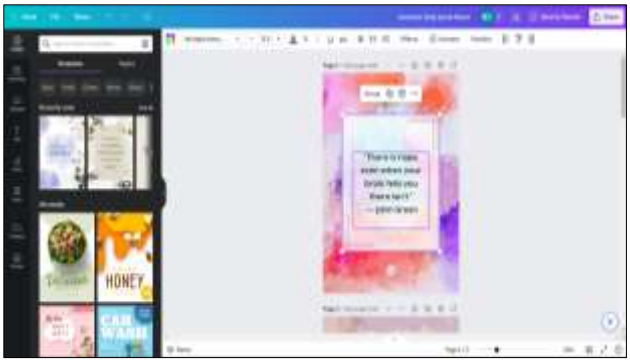
Interfaces	Description	Interfaces	Description
	The welcome screen of the proposed application is presented to the user. By interacting with the "Get Started" button, the user will be redirected to the sign-in interface.		The application's main menu interface encompasses the following key modules: emotional guidance, journal, mood chart, self-reflective, and positive vibes.
	The application provides both a sign-in interface for existing users and a sign-up interface to enable new users to register an account.		This is the emotional guidance module interface.
	The mood selection and journal module interfaces enable users to record their moods for the corresponding date.		This module features a mood chart interface that allows users to record and track their weekly and monthly mood patterns.
	This is the self-reflective and dashboard interface dashboard interface that will show the weekly mood chart with conclusion, self-reflective collection and DASS-21 test.		The positive vibes module offers users the ability to select from a variety of relaxing multimedia content, including images, videos, inspirational quotations, and soothing audio tracks.

Table 7
Application assets development

Assets	Development	Description
Videos		The multimedia assets, including videos, were sourced from YouTube and subsequently edited using Adobe Premier Pro. The video thumbnails were adjusted to enable users to easily identify and select the desired meditation content by viewing the thumbnail titles within the application module. The edited videos were then saved in the MPEG-4 format.
Graphics		The majority of the graphics used in the Therapist application were edited and created using Canva to align with the proposed application's requirements. The graphic elements and templates were selected from Canva, and customized text was integrated into the graphics. Subsequently, the graphics were downloaded and saved in the Portable Network Graphics format.
Audio		The majority of the audio assets utilized in the Therapist application were sourced from online platforms that provide free audio resources, such as Pixabay. These audio files were subsequently saved in the Moving Picture Experts Group Layer-3 Audio format.

2.5 Testing Stage

The primary aim of the testing stage is to assess the application's functionality and usability for the target user group, ensuring the application's objectives are met. The integration of the application's functions was an iterative process, with continuous updates made throughout the development stage to enhance the application. Two types of testing were conducted. The first test is the functionality test focusing the application's functionality on each module. The questions for this test are tabulated in Table 8. The second test is usability test using System Usability Scale (SUS) [38]. There are 10 SUS questions as shown in Table 9. The rating system for both test is by using 5-point Likert scales as shown in Table 10.

The respondents for the tests are students from public and private universities across Malaysia. A total number of 30 respondents are involved in the testing. Because of the difficulties to get respondents who really experiencing mental health issues such as data privacy and confidentiality,

we use simple random sampling method in recruiting the respondents. All respondents were given the developed app to be tested. Then the test data was collected using Google Form.

Table 8
Functionality test questions

No.	Question
Q1	In emotional guidance module interface, I can select the guidance I want and view the content.
Q2	In journal module interface, I can select my mood, write journal in text, upload photo and save the data successfully on specific date selected.
Q3	In mood chart module interface, I can view my average mood patterns in weekly and monthly.
Q4	In self-reflective module interface, I can type in the text field and save the text data successfully.
Q5	In positive vibes module interface, I can play the videos and music smoothly and also able to get full screen for the images and videos.

Table 9
SUS questions

No.	Question
Q1	I think that I would like to use this application frequently.
Q2	I found the application unnecessarily complex.
Q3	I thought the application was easy to use.
Q4	I think that I would need the support of a technical person to be able to use this application.
Q5	I found the various functions in this application were well integrated.
Q6	I thought there was too much inconsistency in this application.
Q7	I would image that most people would learn to use this application very quickly.
Q8	I found the system very cumbersome to use.
Q9	I felt very confident using this application.
Q10	I needed to learn a lot of things before I could get going with this system.

Table 10
5-point Likert scale

Scale	Description
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

3. Results

3.1 Functionality Test Results

Figure 8 shows that users are generally satisfied with the application's functionalities, though there are some areas for improvement. The majority of feedback is positive, indicating that the core features are reliable, intuitive, and meet the user's expectations.

The Emotional Guidance Module received high ratings, with 86.6% of respondents selecting "Agree" or "Strongly Agree." This indicates that users find the guidance content accessible and easy to navigate, suggesting that the interface is intuitive and user-friendly. The small percentage of neutral and disagreeing responses (13.3%) implies that minor refinements in content presentation or navigation could enhance the overall user experience.

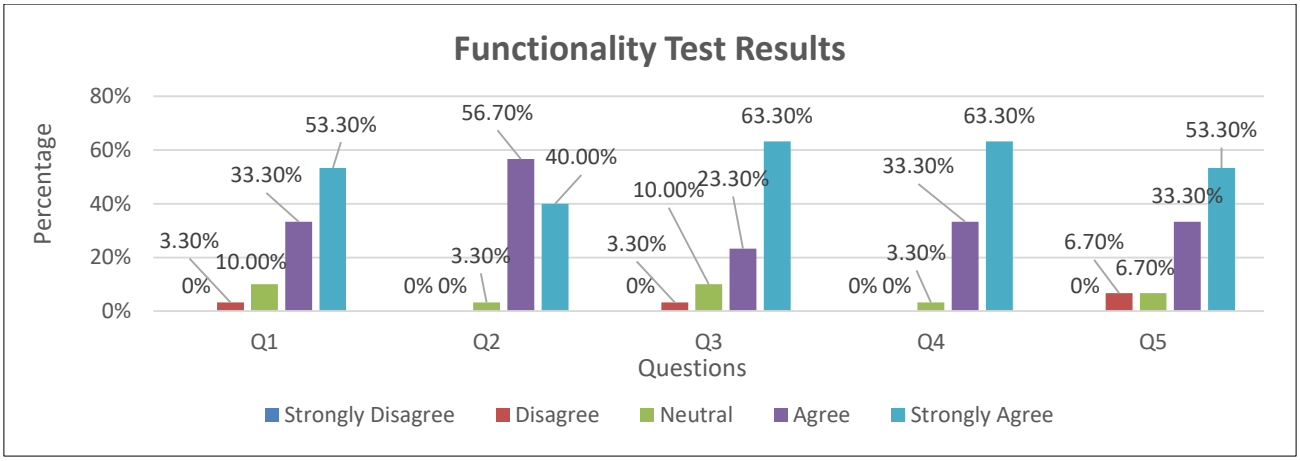


Fig. 8 Functionality test result

In the Journal Module, nearly all users (96.7%) reported satisfaction with the ability to select moods, write journal entries, and upload photos. This feedback indicates that the interface effectively supports complex interactions, from mood selection to data entry. Only a small percentage (3.3%) remained neutral, suggesting the module performs well but might benefit from slight adjustments to meet the needs of those who are indifferent.

The Mood Chart Module saw a positive response overall, with 73.3% of users satisfied. However, 23.3% selected a neutral response, suggesting that some users might struggle with how mood patterns are displayed or analyzed. This implies a need to enhance data visualization or offer more customization to make mood tracking clearer and more engaging for a broader user base.

For the Self-Reflective Module, the feedback was overwhelmingly positive, with 96.6% of users agreeing that the module's functionality met their expectations. This suggests that the module is stable and user-friendly, with little need for modification. Maintaining this standard can serve as a benchmark for other modules.

The Positive Vibes Module received moderately high ratings, with 86.6% of respondents satisfied. However, the presence of neutral (6.7%) and disagree (6.7%) responses indicates potential issues, possibly with media playback or full-screen viewing. This suggests the need to optimize video and music playback for smoother performance and address any technical glitches that may disrupt user experience.

The Therapist application is well-functioning, with high user satisfaction. However, improvements in the Mood Chart and Positive Vibes modules, clearer data visualization, personalized settings, and improved media functionality could enhance user engagement.

3.2 Usability Test Results

Table 11 displays the respondent scores based on the SUS evaluation. The method of calculating the total score begins with the user's responses. For positive (odd-numbered) questions, we deduct one from the user's response score. For example, if a user clicks "Agree" (4) for a positive question, the calculation is 4 - 1 = 3. In contrast, for negative (even-numbered) questions, decrease the user's score from 5. If a user clicks "Disagree" (2) for a negative question, the computation is 5 - 2 = 3. This change converts all replies to a 0–4 scale, with higher numbers consistently indicating better usability.

Table 11
Respondent's score

Respondent	Item score										Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	score
R01	5	2	5	1	5	2	4	2	5	2	87.5
R02	4	3	4	2	4	3	5	1	4	1	77.5
R03	5	1	5	1	5	1	5	1	5	1	100.0
R04	5	2	4	2	5	1	4	1	4	2	85.0
R05	5	1	5	1	5	2	4	2	5	2	90.0
R06	4	1	3	2	4	3	5	1	4	1	80.0
R07	5	2	5	2	4	2	5	2	5	2	85.0
R08	4	1	4	2	5	1	5	1	4	2	87.5
R09	4	3	4	3	4	2	4	2	4	3	67.5
R10	5	1	4	1	4	2	4	1	5	1	90.0
R11	5	1	5	2	5	1	4	1	5	1	95.0
R12	4	1	5	1	4	2	5	1	4	1	90.0
R13	5	1	5	3	4	2	4	2	4	3	77.5
R14	5	2	4	1	5	2	4	1	5	1	90.0
R15	5	2	5	2	4	1	4	1	5	1	90.0
R16	5	2	5	1	5	1	5	1	5	1	97.5
R17	4	1	4	1	4	2	4	1	5	1	87.5
R18	4	3	4	2	4	1	4	1	5	1	82.5
R19	5	1	4	1	4	2	5	1	4	1	90.0
R20	5	1	5	1	5	2	4	2	5	2	90.0
R21	4	1	5	2	4	3	5	1	4	1	85.0
R22	5	1	5	1	5	1	5	1	5	1	100.0
R23	4	1	3	2	5	1	4	1	4	2	82.5
R24	4	3	4	2	5	1	4	1	4	2	80.0
R25	5	1	5	2	4	2	5	2	5	2	87.5
R26	5	2	4	2	5	1	4	1	3	2	82.5
R27	5	2	5	3	4	2	4	1	4	3	77.5
R28	5	2	5	2	4	2	5	2	5	2	85.0
R29	4	3	4	2	5	1	4	1	4	2	80.0
R30	4	1	4	1	4	2	5	1	4	1	87.5
Total score											2587.5

After calculating the adjusted scores for all ten questions, we add them together. This generates a raw score that ranges from 0 to 40. To calculate the final SUS score, multiply the total sum by 2.5. This phase normalizes the results on a scale of 0 to 100. Although the SUS score appears to be a percentage, it is actually a usability indication that allows for rapid comparisons.

The formula used to obtain average usability results based on the SUS is as in Eq. (1):

$$\text{SUS Average Score} = \frac{\sum \text{R} \times 2.5}{\text{n}} \quad (1)$$

Where,

Odd items (Q1, Q3, Q5, Q7, Q9) = contribution - 5

Even items (Q2, Q4, Q6, Q8, Q10) = contribution – 1

$\sum R$ = (odd items + even items)

n = Total respondents

Therefore,

$$\text{SUS Average Score} = \frac{2587.5}{30}$$
$$= 86.25$$

The SUS Grade Scale (Figure 9) would classify a score of 86.25 as an "B." This grade reflects top-tier usability, indicating that users rate the application as one of the best they've encountered. It aligns with user expectations for high-quality design and performance, suggesting that the system is reliable and efficient.

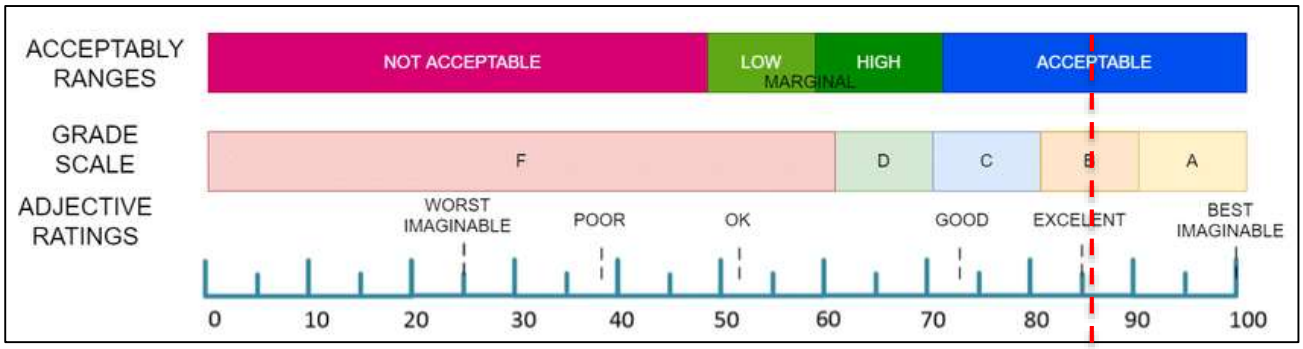


Fig. 9. System Usability Scale (SUS) [38]

On the SUS Adjective Ratings scale, a score of 86.25, implies that the application is perceived to have "Excellent" usability for some users. This means that the application's ease of use, clarity, and performance likely meet or surpass what users expected from the interface. It implies that the overall design and functionality resonate well with the users, providing a pleasant experience.

In conclusion, a SUS score of 86.25 indicates that the system has achieved an excellent standard of usability, well above average. Users likely find it intuitive, efficient, and visually appealing, making it a well-designed platform that supports seamless interactions. This strong usability score suggests the system is already meeting most user expectations, with only minor improvements needed to maintain or further enhance user satisfaction.

4. Conclusions

The Therapist mobile application was successfully developed with four core modules: Emotional Guidance, Journal, Mood Chart, and Self-Reflective. The project accomplished its three objectives by designing the application based on the DASS-21 inventory model and creating an Android platform that offers emotional control guidance, mood tracking, and self-journaling features for university students. The functional and usability testing yielded positive results, with the System Usability Scale score reaching 86.25, which falls within the "Acceptable" range. Furthermore, the application received a Grade Scale of "B" and an Adjective Rating of "Excellent", indicating that it effectively met the needs of the target user group.

The Therapist mobile application offers several advantages. The content has been verified by the Deputy Chief Officer of Psychology at the University Counseling Center at Universiti Tun Hussein Onn Malaysia, who served as the Subject Matter Expert. Consequently, the application is capable of providing mental health support for university students. Additionally, the emotional guidance

information has been referenced from the official portal of the Kementerian Kesihatan Malaysia, allowing the application to deliver similar knowledge. The Therapist application also includes a mood chart recorder to help students track and identify their mood patterns, as well as the DASS-21 test to facilitate students' mental health assessments within the application.

Despite the application's advantages, the researchers identified several areas for improvement. For future iterations, it is suggested to enhance the mood chart module with more detailed functionalities. Additionally, the emotional guidance module could offer a wider range of emotion support, and the positive vibes module could incorporate a greater variety of relaxing multimedia content. Furthermore, the journal module could enable users to upload a larger number of photos and videos. The apps might also be integrated to the university counselling centre or linked to professional resources, such as counseling services or emergency helplines.

This emotion management mobile applications present a comprehensive suite of tools and strategies to support the mental health and overall well-being of university students. By offering convenient, accessible, and highly personalized approaches, this app has the potential to significantly enhance the academic, emotional, and personal experiences of university students grappling with a range of mental health challenges. The wide-ranging capabilities of these applications, which encompass evidence-based techniques such as cognitive-behavioral therapy, mindfulness practices, and professional counseling, combined with their unparalleled accessibility and tailored nature, make them an invaluable resource for university students seeking effective management of issues like depression, anxiety, and stress. The versatility and multifaceted support offered by these emotion management mobile apps can empower students to develop crucial coping strategies, gain a deeper understanding of their thought patterns and emotional responses, and cultivate a greater sense of inner calm, focus, and emotional resilience – all of which are essential for their overall academic, personal, and professional success. In conclusion, therapist applications are positioned to revolutionize emotion management and mental health interventions especially in UTHM by enhancing accessibility, enabling personalization and fostering innovation. These advances will play a crucial role in addressing the growing mental health burden among students.

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